

Bodily rights and property rights

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Whereas previous discussions on ownership of biological material have been much informed by the natural rights tradition, insufficient attention has been paid to the strand in liberal political theory represented by Felix Cohen, Tony Honoré, and others, which treats property relations as socially constructed bundles of rights. In accordance with that tradition, we propose that the primary normative issue is what combination of rights a person should have to a particular item of biological material. Whether that bundle qualifies to be called “property” or “ownership” is a secondary, terminological issue. We suggest five principles of bodily rights and show how they can be applied to the construction of ethically appropriate bundles of rights to biological material.

indivisible unit that is analytically prior to society. By distinguishing between the components of these bundles, it is possible to develop types of ownership relations that are appropriate for different objects of ownership. (For the purposes of the present article the words “property” and “ownership” will be treated as synonyms.)

In section one we introduce the social constructivist view of property, contrasting it with the natural rights view. In section two we summarise the components of property rights proposed in this tradition, and suggest a new list of such components, intended to cover the specific issues relating to biological material. In section three we discuss the different types of bundles that can be formed from these components. In section four we introduce our five principles of bodily rights and show how they can be used in constructing bundles of rights for different types of biological material. Some of these bundles will be property rights in the traditional sense, whereas other are better characterised as inalienable, or non-tradable, rights.

1. TWO VIEWS OF PROPERTY

With respect to property rights there are two major rival schools of thought in political philosophy. One of these is generally referred to as the natural rights theory, whereas the other lacks an established name. We propose to call it the social constructivist theory of property.

The natural rights theory of property received its most famous expression from John Locke in his *Two Treatises of Government* (1690).²² Since a core purpose of his political philosophy was to defend individual rights against political absolutism it was essential for him to show that such rights (including property rights) have legitimacy independently of, and antecedent to, government. On Locke’s account, man is bound by a duty to God to preserve His creatures (including ourselves). We cannot carry out this duty efficiently without exclusive rights to land and other objects—that is, private property rights. When working, for instance, on a previously unclaimed plot of land or on a piece of wood we mix our labour with the object in question, thus adding value to it. On Locke’s view, this process makes us the legitimate and exclusive owners of that plot of land or piece of wood. It should be noted here that Locke, in stark contrast to—for example, Robert Nozick—argued that the riches of the earth were not initially unowned. Quite on the contrary he stipulated that the earth was *res communis*—that is, owned by all of humanity, given to us by God.

The role of commerce and economic transactions in health care in general, and the buying and selling of human biological material in particular, are among the most controversial issues in health policy. Following Richard M Titmuss’s pioneering work, the pros and cons of paying blood donors have been subject to an occasionally heated debate.^{1–6} The parallel issue of transplantation organs from living donors, in particular kidneys, has been the subject of controversies, and so have practices of paying sperm and oocyte donors.^{7–15} In addition, there are ongoing debates regarding the commodification and commercialisation of stem cells; cell lines developed from tumour cells; tissues stored in biobanks, and information extracted from sequencing human DNA.^{16–21}

An underlying issue in these discussions is whether various types of biological material can be owned. This issue is crucial since ownership is a precondition for (the standard forms of) economic transactions. That which cannot be owned, such as the air we breathe, cannot be sold or bought. Therefore, in order to deal successfully with the complex issues of commerce and remuneration, we need to clarify to what extent biological material can be owned.

The purpose of this article is to provide a general analytical framework for discussions on ownership of biological material. Previous analyses have, in our view, made insufficient use of some of the major contributions to the general philosophy of property made by legal and political philosophers. We intend to show that bioethics has much to learn from the analytical tradition in liberal political thought that treats property as a socially constructed bundle of separable social relations rather than as an

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Lockean natural rights theory is influential, not least in legal reasoning in the common law tradition. It is also frequently referred to in bioethical discussions. Proposals that dead bodies are the property of living relatives have been rejected by American courts on the Lockean ground that no mixture of labour has taken place. Hence, a dead body is instead *res nullis*, owned by no one.^{17 23 24} On the other hand, in the famous case *John Moore v The Regents of the University of California*, mixing of labour was accepted as the foundation of a rightful property claim to a cell line.²⁵

Locke's natural rights theory has the distinct advantage of providing a general account of property that gives some guidance to when legitimate ownership is present or not. The approach has, however, been subject to criticism. If mixing one's labour with an object indeed provides a basis for legitimate ownership of that object, then the labourer should arguably be entitled to the added value she created rather than to the value of the entire object. It has also been pointed out that the actual mixing of labour does not necessarily yield added value. As was observed by Robert Nozick: "[i]f I own a can of tomato juice and spill it in the sea...do I thereby come to own the sea or have I foolishly dissipated my tomato juice?"²⁶

For the purposes of bioethical analysis it is particularly unfortunate that the natural rights account of property is an all or nothing theory with respect to the contents of property rights. Although the theory provides criteria to determine whether a certain person owns a particular object, it lacks the power to determine the exact nature of the property right in question. Property in biological material can take very different forms, from patents and other forms of intellectual property to traditional ownership of material objects. We therefore need an account of property that is better equipped than traditional natural rights theory to provide guidance about the appropriate form of property rights.

Such an account has been developed in the utilitarian tradition. According to Jeremy Bentham, "there is no natural property". To the contrary: "Property and law are born and must die together. Before the laws, there was no property; take away law, all property ceases".²⁷ Similarly, Henry Sidgwick treated the choice of proper rules for property as a matter of "expediency" to be determined by a balancing of different considerations.²⁸

In a famous essay, Felix Cohen (1907–1953) further developed this approach to property.²⁵ On his view, property rights have their origin in the law, and historically laws express the interests of those who write and promulgate them. Ethically, on the other hand, the merits of any law or legal arrangement should be judged according to how well it promotes the good life of those affected by it. Therefore, property rights should be arranged such that they promote a proper combination of social goals such as justice and economic productivity.

One of Cohen's examples is the ownership of newborn livestock. Already the Laws of Manu, supposedly the oldest legal code in the world, stipulated that a newborn mule belongs to the owner of the mare. Perhaps a good argument could be made that the owner of the stud ought to have a share in the offspring, but legal systems have been consistent in granting no such rights. According to Cohen, this is best understood in terms of social expediency; since the identity of the mother is seldom in doubt the chosen solution is best suited to avoid disruptive social and legal feuds.

We choose to call this view a social constructivist view of ownership since it stipulates that ownership is the result of a series of social choices and events that could well have been different. (The social constructivist theory of ownership should not be confused with other theories that treat natural phenomena as social constructions.²⁹)

According to this view, society is free to choose the system of property rights that best promotes social goods, such as justice and economic productivity. One of the chief tasks of government is to issue laws that create and define such a system or rights. Property rights, taken in this sense, cannot exist independently of (some form of) government.

The social constructivist view stands in contrast to the natural rights theory of ownership, according to which ownership is based on rules that are independent of social choices and conventions. Natural rights theorists tend to think of property as a relation between the owner and the owned object. Cohen pointed out that for a detailed analysis of property rights, it is more useful to see those rights as sets (bundles) of legal relations between the owner and the non-owners of an object. A person's ownership of a piece of land includes rights that entitle her to exclude others from entering the land, rights to charge them for doing so, rights to sell the land, and so forth.²⁵ The rights and obligations that make up the bundle may vary depending on the nature of the object in question. In some cases there is more than one bundle of rights relating to one and the same object, such as a mining concession and land ownership with respect to one and the same piece of land. This feature of his approach is highly applicable to bioethics. It can help explain why, for instance, both the patient from whom a cell line was taken and the researchers who refined it seem to have (different types of) ownership rights to that cell line.

2. COMPONENTS OF BUNDLES OF RIGHTS

Several proponents of the social constructivist theory of ownership have provided systematic accounts of the components of the bundles of rights that constitute ownership. To the best of our knowledge, the first such proposal was put forward by Henry Sidgwick in his *Elements of Politics* (1891). Sidgwick's three components of ownership were: the right of exclusive use, the right to destroy, and the right to alienate—for example, by means of donation, exchange, or barter. Notably, however, he argued that the right to bequeath should not be included among the rights that define the notions property.²⁸

Today, Sidgwick's analysis is rarely referred to. The most influential dimensional analysis is instead Tony Honore's list of eleven types of legal relations that he considers to be the major components of the full liberal type of ownership manifesting itself in modern capitalism.³⁰

1. *The right to possess*—namely "to have exclusive physical control of a thing, or to have such control as the nature of the thing admits".

2. *The right to use*—that is, "the owner's personal use and enjoyment of the thing owned".

3. *The right to manage*—that is, to "decide how and by whom the thing owned shall be used".

4. *The right to income*—that is, to reap the benefits from "foregoing the personal use of a thing and allowing others to use it for reward".

5. *The right to the capital*—that is, "the power to alienate the thing, and the liberty to consume, waste, or destroy the whole or part of it". This includes the power to transfer the holder's title to the object.

6. *The right to security*—meaning that the owner "should be able to look forward to remaining owner indefinitely if he so chooses and if he remains solvent". An exception is made for the power of the state to expropriate against adequate compensation.

7. *The incident of transmissibility*—meaning that "the interest can be transmitted to the holder's successors, and so on ad infinitum".

8. *The incident of absence of term*—meaning that ownership does not cease to be valid “at a future date or on the occurrence of a future event which is itself certain to occur”.

9. *The duty to prevent harm*—meaning that the owner’s liberty to use and manage the thing owned as he chooses is “subject to the condition that not only may he not use it to harm others, but he must prevent others from using the thing to harm other members of society”.

10. *Liability to execution*—meaning that the owned thing can be “taken away from him for debt, either by execution for a judgment debt or insolvency”.

11. *Residuary character*—meaning that “either immediately or ultimately, the extinction of other interests would inure to [the owner’s] benefit”.³⁰

Several scholars have proposed modifications of Honoré’s analysis, or alternatives to it. Lawrence C Becker extended Honoré’s list into one with thirteen instead of eleven components.³¹ The most important difference is that he divided Honoré’s fifth component, the right to the capital, into four parts. One of these is the right (power) to transmit, which he combined with Honoré’s seventh component. The other three are the right (liberty) to consume or destroy the object in question, the right (liberty) to modify it, and finally the right (power) to alienate it through donation, exchange, or abandonment.³¹

Most of the alternatives to Honoré’s proposal that we are aware of differ from Becker’s in reducing rather than increasing the number of components of property. A list of six components has been proposed by Frank Snare.³² Both Peter Karlen and Robert Goodin have put forward short lists containing only three components.^{33–34} The different accounts of the components of ownership, according to the authors mentioned, are summarised in table 1. It is interesting to note that Honoré, Becker, and Snare differ from the other three in including components that are negative for the owner, such as liability to execution, a duty to prevent harm, and an obligation to compensate for damages.

When it comes to biological material, some of the categories mentioned in table 1 are hardly relevant. This applies for instance to “liability to execution”. Other categories need further elaboration and to some extent subdivision in order to cover the issues at hand. In particular, the distinction between removal of an organ before and after the person’s death has to be included, and the distinction between donating and selling needs to be made explicit since

it is more important for biological material than for most other objects to which one can have rights. In table 2 we propose a categorisation of major components of bundles of rights to biological materials, indicating how they correspond to the more general typologies proposed by Honoré and Becker. This table is intended to provide the basis for a detailed discussion of what rights a person should have to some biological material. Its focus is on the rights that are relevant to the alienation of biological material; hence other rights relating to a person’s body—such as rights to health care—are not included. (If they were, then it is likely that more elements from table 1 would have counterparts in table 2.)

3. BUNDLES OF RIGHTS

Most cases of property rights in modern societies do not include all the types of relations presented in table 1. There are also bundles of rights, such as a tenant’s rights with respect to a rented flat, which contain some of the elements of ownership but yet do not suffice for (full) ownership. One problem for the constructivist approach is that it may have difficulties in determining which bundles constitute ownership. Honoré’s approach to this problem was to apply Wittgenstein’s notion of family likeness. On this view, there is no single criterion or combination of criteria that have to be met in order for ownership to be present. “[T]he listed incidents [the 11 components], though they may be together sufficient, are not individually necessary conditions for the person of inheritance to be designated the owner of a particular thing.”³⁰

In our view, although the family likeness approach may be adequate in crosscultural studies of property rights, it does not seem to be a specific enough tool for analysing ownership in modern capitalist societies. For the latter purpose, it appears to be more in line with actual linguistic usage to consider a person’s right to sell an entity as the *core feature of ownership* of that entity. In the vast majority of cases, we are considered to “own” those (material and immaterial) objects that we are allowed to sell, but only rarely is a bundle of rights that does not confer a permission to sell considered to constitute ownership of the entity in question.

In modern society there exist a vast number of transferable rights to different types of entities. Instead of creating a complete set of legal regulations anew for each of these types of rights, they are all subsumed under the unifying

Table 1 Six theories of the components of property

Becker	Honoré	Snare	Goodin	Sidgwick	Karlen
1. Right to possess	1. Right to possess	2. Right of exclusion	3. Right to exclude and to destroy	1. Right of exclusive use	
2. Right to use	2. Right to use	1. Right of use	2. Right to use and to destroy		1. Use
3. Right to manage	3. Right to manage				
4. Right to income	4. Right to the income				
5. Right to consume or destroy	5. Right to the capital			2. Right to destroy	3. Disposition
6. Right to modify					
7. Right to alienate		3. Right of transfer	1. Right to transfer and to destroy	3. Right to alienate	
8. Right to transmit					
	7. Incident of transmissibility				
9. Right to security	6. Right to security				
10. Absence of term	8. Absence of term				
11. Prohibition of harmful use	9. Duty to prevent harm				
12. Liability to execution	10. Liability to execution				
13. Residuary rules	11. Residuary character				
		4. Punishment rules			
		5. Damage rules			
		6. Liability rules			
					2. Enjoyment

Table 2 The major components of bundles of rights to biological material

The right	Corresponding right(s) in Honoré's and Becker's typologies
1. Right to security in life. The right of a person to keep a part of her body, and not have it removed or destroyed.	Honoré 1, 2, 6, 8. Becker 1, 2, 9, 10.
2. Right to security after death. The right of a person that a part of her body is buried or disposed of in the way that she wishes.	Honoré 7, 8. Becker 8, 10.
3. Right to donate for removal in life. The right of a person to give up a part of her body without remuneration, to be removed in her lifetime.	Honoré 5. Becker 7.
4. Right to donate for posthumous removal. The right of a person to give up a part of her body without remuneration, to be removed after her death.	Honoré 5. Becker 7.
5. Right to sell for removal in life. The right of a person to give up a part of her body against remuneration, to be removed in her lifetime.	Honoré 5. Becker 7.
6. Right to sell for posthumous removal. The right of a person to give up a part of her body against remuneration, to be removed after her death.	Honoré 5. Becker 7.
7. Right to income. The right to receive the profits obtainable from the use of a biological material (such as the profits from a cell line). (This differs from a right to sell in referring to the profits obtained at points in time after the initial removal of the material.)	Honoré 4. Becker 4.

institution of property. This is done by the construction of legal entities, such as shares, options, patents, and copyrights, which can be owned and traded. Different bundles of rights to material objects are created by constructing various types of immaterial objects, which are all combined with the same system of ownership. This practice was hinted at by Honoré when noting that “when the legislature or courts think that an interest should be alienable or transmittable, they reify it and say that it can be owned”.³⁰

Of course, not all rights in modern societies are property rights. Another important category is the inalienable (simple) rights that are legally impossible to part. The right that one has to one's own life and person is a prime example; we cannot legally sell ourselves as slaves. The right to vote is another inalienable right, and so are the basic human rights.

Turning to biological material, there is a long tradition of treating the rights that one has to one's bodily parts as inalienable. Immanuel Kant maintained that “a man is not entitled to sell his limbs for money, not even if he were to get 10,000 thalers for one finger for otherwise all the man's limbs might be sold off”.³⁵ Generally speaking, legal systems do not honour agreements to part with bodily parts against remuneration—that is, the law does not give us full property rights to our organs. The reason for this seems to be that the lawgiver wishes to protect us against loss of organs in much the same way as we are protected from becoming slaves by a legal system that does not honour a voluntary agreement to enter slavery. The inappropriateness of traditional (full) property rights to bodily parts was also emphasised by Honoré, who wrote:

“In other cases again, we speak not of having a thing but a right in or to something. Thus, a person does not either own or have his body or liberty, though perhaps he owns dead parts of his body such as his hair and nails. In general he has, instead, a right to bodily security or liberty, and a right to determine how parts of his body, such as his kidneys, are to be used during his lifetime if he chooses to forego their use or, being dead, no longer has use for them. Here the analogy with the ownership of a thing is tenuous. These rights are either inalienable or can be dealt with only by something in the nature of a gift.”³⁰

As was indicated in the last quoted sentence, due to transplantation surgery healthy organs can now be parted with for much better reason than in Kant's time. As a consequence of this, a third type of rights bundle has emerged in modern legal systems, which is distinguishable both from full property rights and from inalienable rights: a

person can have a right to give up an organ by donation or bequest, but still not be allowed to sell it. This is the type of right that most modern jurisdictions assign to us with respect to our kidneys. We propose to call this type of rights bundle non-tradable rights. Logically speaking, inalienable rights are non-tradable. For terminological convenience, however, we use the term “non-tradable” to denote the situation where donation but not selling is allowed.

An important lesson to be drawn from this is that the issue of property rights to biological material should not be reduced to a simple binary issue of owning or not owning. A person's legal rights with respect to a biological material (from her own body or that of someone else) can be constructed in many different ways, depending on what types of legal relations are included in the bundle. The primary normative issue is what such a bundle of rights should contain. It is only a secondary issue whether the chosen bundle of rights should be called a property right.

Discussions of this secondary issue are complicated by terminological ambiguities. The words “own” and “ownership” are often used to denote not only (full) property rights but also some (but not all) of the inalienable and non-tradable rights. It is common to say that a person “owns” her body (but not that she “owns” her freedom of expression or her right to vote). This is an established usage of the word that cannot easily be eliminated. In a scholarly context, however, it is important to distinguish between on the one hand usages of “own” that refer to full property rights that include a right to sell and on the other hand usages of the same word that refer to inalienable or non-tradable rights.

4. FIVE PRINCIPLES OF BODILY RIGHTS

Equipped with the distinctions introduced in the previous sections, we can now turn to the normative task of developing principles for what kind of ownership or other rights a person should have to parts of her own body. We will do this by proposing five moral principles of bodily rights. By a bodily right we mean a right that regulates a person's privileges with respect to her own body. A bodily right may, but need not, give rise to a property right. Therefore, none of the five principles mentions ownership or property. The procedure that we propose is that for each type of biological material under consideration, the five principles of bodily rights be used to guide a decision on which of the components listed in table 2 should be included in an appropriate bundle of rights for the type of material in question. Only after this has been done can it be determined whether the bundle is classifiable as a property right or as another type of right, such as an inalienable or non-tradable right.

The first principle of bodily rights expresses the individual's sovereignty with respect to her own body. We can express it as follows:

The first principle of bodily rights

No material may be taken from a person's body without that person's informed consent.

This is a very general principle. It has exceptions in certain applications, such as the treatment of patients unable to give informed consent, and blood testing for forensic purposes. Since these exceptions are peripheral for the purposes of the present paper, we will not give an account of them here. In the terms of table 2, this principle amounts to saying that components 1 (right to security in life) and 2 (right to security after death) should normally be included in the bundle of rights that a person has with respect to parts of her own body. In combination, these two components stipulate that no human being can be justly deprived of a part of her body without her explicit consent, neither in life nor in death.

The informed consent referred to in the first principle should specify the intended usage of the material. As the experience with biobanks shows us, however, it is no trivial matter to determine how precise that specification has to be. A general specification such as "for future medical research" may not be sufficient.³⁶

Given general principles of medical ethics, the second principle of bodily rights is fundamental and self evident. It is included for completeness.

The second principle of bodily rights

Under conditions of informed consent, removal of bodily material is allowed as a means to obtain significant therapeutic advantages for the person herself.

Our third principle brings us to the more difficult cases, namely the removal of biological material from one person in order to obtain advantages for somebody else. Transplantation of organs from living donors has saved thousands of lives, and blood transfusions probably many more. A reasonable normative framework of bodily rights should facilitate these practices, and the same applies to other practices under development that may be therapeutically useful while imposing at most very small risks on the persons from whom the material originates. Just as in current practice (and in accordance with our first principle), informed consent should be a prerequisite for any such procedure.

The third principle of bodily rights

Under conditions of informed consent, removal of bodily material is allowed as a means to obtain significant therapeutic advantages for one or more other persons, provided that the removal does not cause serious or disproportionate harm to the person from whom the material is taken.

For practical purposes, this principle can be taken to imply the inclusion of components 3 (right to donate for removal in life) and 4 (right to donate for posthumous removal). The clause about "serious or disproportionate harm to the person from whom the material is taken" is relevant also for the latter component, since psychological harm may result from a person's awareness that she will not be buried intact in the way required by her religion. The third principle is compatible with components 5 (right to sell for removal in life) and 6 (right to sell for posthumous removal), but does not imply either of these.

Trading on a market is known to be an efficient means of distributing commodities to people who need them. Therefore, a general prohibition against selling biological material may be unnecessary and even counterproductive. An alternative approach that needs to be considered is to allow

trade in at least some types of biological materials but prohibit exploitative practices. A major problem with this proposal is its practicability. Even if there is a non-exploitative sale of a kidney, it may in practice be impossible for legal institutions to distinguish it from exploitative sales.

For concreteness, consider a somewhat different example that we have chosen since it makes the coexistence of exploitative and non-exploitative commerce in the same material plausible. A famous artist has decided to create a sculpture made entirely out of human earlobes and receipts showing that they have been bought at ten dollars a piece. Before she can create this masterpiece she has to decide how to obtain the raw material. There are two options: she can either buy the earlobes from the desperately poor, or she can acquire them from rich art collectors who want to sell their earlobes at this nominal price in order to be immortalised. Clearly, the former option is more exploitative than the latter one. A consistent legal system cannot, however, be so constructed that the earlobe of one person is tradable but not that of another. If mutilation for artistic purposes becomes a social problem in need of regulation (which is not inconceivable, given some current developments in the visual arts—for example, Gunther von Hagen's exhibition *Körperwelten* <http://www.bodyworlds.com/en/pages/home.-asp>) legislators will have to consider laws that prohibit exploitation for such purposes in the same way as exploitative procurement of organs for transplantation is prohibited. We arrive at the following principle.

The fourth principle of bodily rights

If there is a significant risk that a certain practice in dealing with a biological material will result in exploitation of human beings, then that practice should either be disallowed or modified so that the exploitation is brought to an end.

This principle provides an empirical criterion for whether components 5 (right to sell for removal in life) and 6 (right to sell for posthumous removal) should be included in the bundle of rights that individuals have with respect to a particular type of material from their bodies. In the application of this criterion it is important to pay attention to the social conditions under which trade in biological material takes place. As we noted above, the risk for exploitation may not be the same for a full market and for a restricted market where buyer and seller are part of the same healthcare system, where prices are fixed, and the same type of queuing system for recipients is used as in the present donation based systems.

The fourth principle is also applicable to components 3 (right to donate for removal in life) and 4 (right to donate for posthumous removal), since donations may well be exploitative. It is no easy matter to turn down a close relative who asks for a kidney. According to this principle, systems for organ donation have to be arranged so that they leave potential donors with a real, autonomous choice.

Finally, the fourth principle has relevance also for component 7 (right to income). Economic offers to people who part with organs may be exploitative in much the same way as excessive payment to research subjects.

Our fifth and final principle of bodily rights applies to the fair distribution of medical resources that originate as parts of somebody's body. Scarcity in medical resources gives rise to difficult distributional problems. These can be solved either by letting such resources be allocated outside of the market or by regulating the market in such way that justice in distribution is obtained. For medical resources that are not scarce, a market in human biological material does not seem to threaten the supply to patients (at least not in any other way than any market in medical supplies can). This can be summarised as follows.

The fifth principle of bodily rights

The system of legal rights should promote the efficient distribution of biological material for therapeutic purposes to patients according to their medical needs.

This principle has relevance for all seven components listed in table 2. It provides additional support for components 1 (right to security in life) and 2 (right to security after death), since any stable system of distribution has to provide security for people so that they know that their wishes will be respected. It provides support for components 3 (right to donate for removal in life) and 4 (right to donate for posthumous removal), on the assumption that any efficient distribution system contains donation either as the only way or at least as one of the ways in which human biological material can be obtained for therapeutic principles. It provides a criterion to be used in appraisals of components 5 (right to sell for removal in life), 6 (right to sell for posthumous removal), and 7 (right to income). Here, it is important to note that it is an empirical issue to what extent (and for what types of biological material) this principle supports trade in biological material.

In our view, the appropriate choice of a bundle of rights may differ for different types of biological material, for instance according to how scarce they are and how important they are for the health of the person from whom they are taken. It is, for instance, probable that the disadvantages of a market system will be smaller, and the advantages greater, for material that can be duplicated, such as stem cells and genetic material than for material such as complete organs, which cannot be duplicated. For the final analysis, ethical principles will have to be combined with empirical information about the actual consequences of different procurement and distribution procedures, both for the individuals from whom the biological material is taken and for those who depend for their health on the availability of such material.

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